HEAT SOURCE LOCATOR

TECHNICAL FIELD

This invention relates to locators, and specifically to locators which sense the presence of a heat source.

BACKGROUND OF THE INVENTION

Thermal or heat detectors have previously existed. These devices are often used by hunters in locating wounded animals which have escaped into the underbrush. Military personnel and police officers also utilize these devices in locating individuals attempting to hide from view behind objects or individuals hiding in the dark.

These detectors typically include a thermal sensor in the form of an infrared scanner. The scanner senses the difference in temperature between the subject and its surrounding environment. As the temperature difference is sensed a visual signal is produced through the illumination of a light.

A problem related to these devices has been the pinpointing of the subject once it has been detected by the thermal sensor in a general area. This problem is especially prevalent at night where it may be difficult to tell exactly where the device is pointing when the detection signal is given.

In an attempt to correct this problem operators of these devices have utilized a flashlight which is aimed to

illuminate the general area being searched which illuminates the subject with a visible light. The illumination of the subject however enables the subject to realize that its position has been ascertained. Thus, an individual hiding from the police or military may attempt to flee knowing that capture is eminent. Additionally, the production of the light allows the hiding subject to ascertain the source of the light and therefore the searchers position, thus endangering the searcher from attack by the hidden subject. Lastly, the use of a flashlight requires the operator to use both hands, one to operate the device and the other to operate the flashlight.

Accordingly, it is seen that a need remains for a heat source locator which may pinpoint the location of a subject without enabling the subject to determine the location of the searcher or without alerting the subject that its location has been determined. It is to the provision of such therefore that the present invention is primarily directed.

SUMMARY OF THE INVENTION

In a preferred form of the invention a heat source locator to be used in combination with a light viewing device enabling one to view a light outside the visible spectrum of a human is disclosed. The heat source locator comprises thermal detection means for detecting a thermal change within a field of view. The thermal detection means has an axis generally linear centralized within the field of view, and an indicator which indicates the sensing of a heat source. The heat source locator also has light emitting means for generating light having a wavelength outside the visible spectrum of a human. The light beam is aligned generally parallel and closely adjacent to the thermal detection means axis. With this construction, an operator may locate a heat source by sensing the presence

of the heat source through the thermal detection means and then locate the position of the located heat source by directing the light beam from the light emitting means while viewing the location with a light viewing device.

In another preferred form of the invention a heat source locator comprises a housing, a thermal detector mounted within the housing to detect a heat source generally along a field of view, and a light emitting device mounted within the housing positioned to emit a beam of light and generally centered along the thermal detector field of view. With this construction an operator may locate a heat source by sensing the presence of the heat source through the thermal detector and then locating the position of the heat source by directing the light beam from the light emitting device

BRIEF DESCRIPTION OF THE DRAWING

Fig. 1 is a perspective of a heat source locator embodying principles of the invention is a preferred form.

Fig. 2 is a schematic view of the heat source locator of Fig 1 in use.

Fig. 3 is a schematic diagram of circuit for the heat source locator of Fig. 1.

DETAILED DESCRIPTION

With reference next to the drawings, there is shown a heat source locator 10 in a preferred form of the invention. The locator 10 has an elongated housing 11 configured to be easily grasped within an operator's hand. The housing 11 has a front wall 12 with a large central opening 13, a visible light beam opening 14, and an invisible light beam opening 15. The housing also has a top wall 16 having a control panel 17.

The heat source locator 10 also has a thermal detector 21, an infrared laser 22, a visible light laser 23, an earphone jack 24, and a light bar 25 coupled to a microchip 26, all these components in turn are coupled to the outputs of a semi-conductor 27. The microchip is preferably a Microchip Corporation model number 970711FQHB04. The semi-conductor 27 is preferably a Dallas Semiconductor model number DS1669S-100. The thermal detector 21 may be a model number Siemens AG or Heimen. The infrared laser 22 may be a model number Amstech Incorporated of Alpharetta, Georgia model LM 850 Series. The visible light laser 23 may be a model number Amstech Incorporated of Alpharetta, Georgia model LM 650 Series. The thermal detector 21 is mounted within the housing 11 to sense a thermal input within a field of sensitivity or field of view **FV** extending through the front wall central opening 13 and focused upon the thermal detector 21 through a lens 20.

The infrared laser 22 is mounted within the housing 11 to transmit an infrared laser beam **IRB** through the invisible light beam opening 15 in the housing front wall 12. Similarly, the visible laser 23 is mounted within the housing 11 to transmit a visible laser beam **VB** through the visible light beam opening 14 in the housing front wall 12. A conventional nine volt battery 21 is coupled to the semi-conductor 27 which powers the semi-conductor 27, the thermal detector 21, the infrared laser 22, the visible laser 23, an earphone coupled to the earphone jack 24, and the light bar 25. The heat source locator 10 also includes an on/off key 32, an infrared and visible laser on/off key 33, a volume up key 35, a volume down key 36, a sensitivity up key 37 and a sensitivity down key 38, all coupled to the input of the semi-conductor 27 and displayed for operational use upon the control panel 17. The laser on/off key 33 operates so that with the first depression of the key the infrared laser 22 is activated, with the second

depression of the key the visible light laser 23 is activated and the infrared laser 22 is deactivated, and with the third depression of the key the visible light laser 23 is deactivated.

The thermal detector 21 has a field of view **FV** aligned along a longitudinal axis **LA** extending through the thermal detector 21. The infrared laser 22 and visible laser 23 are positioned to emit their light beams **IRB** and **VB** generally parallel to and closely adjacent the longitudinal axis **LA** of the thermal detector 21.

In use, with the operator may utilize conventional equipment to view light of an infrared wavelength, such as infrared eye goggles model number F5001 made by ITT, Inc. of Roanoke, Virginia should the employment of the infrared laser 22 be selected. An operator initiates the operation of the heat source locator 10 by depressing the on/off key 32, which in turn causes the semi-conductor 27 to energize the thermal detector 21. The operator then scans the area in which the operator is attempting to locate a specific heat source, such as a person hiding in the dark, by moving the heat source locator 10 back and forth so as to sweep the field of view of the heat detector 21 across the area to be searched. Once the heat detector 21 senses a change in the perceived heat, through the detection of infrared heat waves, within its field of view **FV** a signal is transmitted and the microchip 26 energizes the light bar 25 accordingly, thus visually indicating to the operator that a heat source has been located. By continually narrowing the range of the sweeping motion of the heat source locator 10 the operator may point the locator 10 at the heat source. Optionally, the operator may employ the use of an earphone coupled to the earphone jack 24 to provide an audible signal.

Once the heat source is generally located by a constant illumination of the light bar 25 the operator may depress the infrared laser on/off key 33. The depression of the infrared laser on/off key 33 causes the semi-conductor 27 to energize the infrared laser 22. As the infrared beam **IRB** from the infrared laser 22 closely parallels the longitudinal axis **LA** of the thermal detector's field of view **FV** the infrared beam **IRB** is impinged upon the target heat source. With the use of the infrared viewing equipment the operator thus sees the exact location which falls along the longitudinal axis **LA** of the heat detector, and assumably the exact location of the targeted heat source.

It should be understood that with the heat source locator used in the just described manner a target may be located and illuminated with a light which is invisible to the target, i.e. light outside the visible spectrum of an animal such as a human. As such, the target is not made aware that its position has been determined. Furthermore, as the light produced by the heat source locator 10 is invisible to the target the location of the operator is not given by the operation of the heat source locator.

Should the operator decide that the use of an invisible light source is not necessary the operator may utilize the visible light laser 23 to pinpoint the position of the target. Here, the procedure is essentially the same as just describe except that the laser on/off key 33 is depressed again so as to energize the visible light laser 23. The visible light laser 23 emits a visible light upon the target, which is assumed to be centered within the field of view of the thermal detector.

It should be understood that while the preferred embodiment shows the use of an infrared laser as an invisible light source, other light sources which produce a light outside the visible spectrum of a human may be used

as an equivalent substitute. As such, the term invisible light as used herein is meant to include all light outside the visible spectrum of an animal and especially a human.

The sensitivity of the heat source locator may be adjusted through the operation of the sensitivity up key 37 and sensitivity down key 38. The operation of the sensitivity up key 37 increases the sensitivity of the thermal detector 21 while the operation of the sensitivity down key 38 decreases the sensitivity of the thermal detector 21. Similarly, the volume to the earphone may be increased or decreased through the operation of the volume up or volume down keys 35 and 36, respectively. The earphone jack and semi-conductor may be designed to disable the light bar when an earphone is plugged into the earphone jack, so as to maintain the stealth quality of the device.

It should be understood that in situations where it is irrelevant that the target be illuminated with a visible light the operator may pinpoint the target's location through the energization of the visible light laser 23. To energize the visible light laser 23 the operator merely depresses the laser on/off key 33 which signals the semi-conductor 27 to energize the visible light laser 23.

A heat locator embodying principles of the present invention is incorporated by the device presently sold by Amstech Incorporated of Alpharetta, Georgia under the trade name HEATSEEKER model number HS3500C, the teachings of which are incorporated herein.

It thus is seen that a heat source detector is now provided which does not disclose the position of the operator to the target and which does not allow the target to become aware that his position has been determined by the operator. While this invention has been described in detail with particular references to the preferred embodiments thereof, it should be understood that many modifications, additions and deletions, in addition to

those expressly recited, may be made thereto without departure from the spirit and scope of the invention as set forth in the following claims.